UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
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August 20, 2007

Mr. Mark Prescott, Chief
Deepwater Ports Standards Division (CG-3PSO-5)
United States Coast Guard Headquarters
2100 Second Street, S.W.
Washington, D.C. 20593

Subject: Bienville Offshore Energy Terminal Draft Environmental Impact Statement; Docket Number: USCG-2006-24644; CEQ: 20070277; ERP: CGD-E02013-AL

Dear Mr. Prescott:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the U. S. Coast Guard's (USCG) Draft Environmental Impact Statement (draft EIS) for the Bienville Offshore Energy Terminal (BOET). Under Section 309 of the CAA, EPA is responsible for reviewing and commenting on major federal actions significantly affecting the quality of the human environment. In addition, EPA is a cooperating agency under NEPA for this project. EPA's review of the draft EIS includes comments pursuant to both EPA roles in this matter.

TORP Terminal L. P. (Applicant) proposes to construct, own and operate a liquefied natural gas (LNG) receiving and regasification facility 63 miles offshore of Alabama in the federal waters of the Gulf of Mexico (Gulf). The proposed project would include a support platform structure and offshore natural gas pipelines totaling approximately 23 miles with connections to shore by existing pipelines. The Applicant has applied to the USCG and the U. S. Maritime Administration (MARAD) for licensing in accordance with the Deepwater Port Act. The Applicant has also applied to EPA for National Pollutant Discharge Elimination System (NPDES) and CAA permits for the construction and operation of this facility.

The draft EIS evaluates the proposed construction and operation of the terminal and pipelines. The facility would have an average process output of 1.2 billion cubic feet of natural gas per day employing a proprietary configuration (HiLoad) of open-loop shell and tube vaporization technology.

As summarized below and discussed in more detail in the enclosed comments, the impacts of greatest concern to EPA associated with the proposed facility are on marine resources, air quality, and hard bottom habitats. EPA believes marine resources – icthyoplankton (fish eggs and larvae) and other planktonic forms and larval life stages – will be impacted by the operation of the facility at both the intake and discharge points.

Fish eggs and larvae would include species of commercial and recreational fisheries. The Applicant's proposed open-loop warming technology is expected to, over time, take in and entrain large volumes of marine icthyoplankton and other plankton with resultant high projected mortality. The proposed warming technology would also discharge cold water back into ambient Gulf waters, which could entrain and cause cold-shock to marine life (plankton and juveniles) in the discharge plume potentially causing lethal or sublethal effects. Because impacts to icthyoplankton in the discharge plume were not addressed in the draft EIS, the overall impacts to marine resources were underestimated. EPA recommends that impacts to icthyoplankton and other marine life at both the intakes and discharges be fully addressed in the final EIS.

Based on our review, the air quality analysis provided in the draft EIS does not include sufficient documentation of all modeling performed. It is also unclear whether the analysis of cumulative air impacts included assessment of impacts from nearby Outer Continental Shelf (OCS) oil and gas platforms. Due to its potentially significant impact, the emissions from LNG carriers using higher sulfur fuel oil should also be quantified and modeled. The enclosed "Detailed Comments" provide the complete informational needs.

The proposed BOET facility is located within the Pinnacle Trends, a protected area of significant topographic bottom relief, and is only two miles from the nearest reef. The proposed 23 miles of pipeline connecting to existing pipeline infrastructure presents additional potential impacts to the Pinnacle Trends features, especially where certain segments are as close as 150 feet away. However, the potential for these impacts could be substantially reduced if an alternate terminal site were to be located closer to the existing pipeline infrastructure. Accordingly, EPA recommends additional review and discussion in the final EIS regarding an alternative to relocate the proposed terminal site.

As you are aware, the USCG evaluated an alternative technology, known as submerged combustion vaporization (SCV), in the draft EIS and found it to meet the USCG's feasibility criteria. EPA supports the USCG's selection of this alternative for further consideration. According to the draft EIS, the SCV alternative would result in substantially reduced adverse impact to the marine environment. Another technology, Ambient Air Vaporization (AAV) was identified in the draft EIS but eliminated from further consideration because of potential navigational safety concerns of fogging and potential concerns of accidental release of heat exchanger fluids that are toxic to marine life. Similar to the SCV alternative, AAV would reduce the potential for adverse impact on the marine resources. Further, according to the draft EIS, AAV is a technology that has been approved by Federal Energy Regulatory Commission at another LNG facility on the Gulf Coast. In addition, by relying on ambient air for the primary heat source, AAV will have substantially lower fuel requirements. We understand that all offshore and onshore LNG facilities currently in operation or in the design phase, use (or would use) some type of closed-loop technology. Therefore, we recommend that the AAV technology also be carried forward for detailed evaluation in the final EIS.

EPA currently has environmental objections to this project as proposed and rates this draft EIS as an "EO-2" (*i.e.*, environmental objections with additional information requested in the final EIS; the description of EPA's ratings is enclosed). As stated, our primary objections focus on the potentially substantive impacts to the marine environment from the operation of the proposed facility using the open-loop vaporization technology. These marine impacts at both the intake and discharge can be avoided by the use of one of the presented alternative closed-loop vaporizing technologies. Therefore, based on our review of the draft EIS and as a cooperating agency to the USCG for this EIS, EPA recommends that the USCG more fully evaluate the SCV and AAV closed-loop technologies in the final EIS as potentially environmentally preferable alternatives. We further recommend that the final EIS explore the feasibility of modifying the Applicant's platform design to incorporate one of these two closed-loop systems. In addition, EPA recommends further minimization of the construction of the associated pipeline for connection to existing gas pipeline infrastructure by potentially moving the terminal facility closer to the existing pipeline infrastructure to the extent feasible. The enclosed "Detailed Comments" specify the additional data needed by EPA to address the NPDES and air permit applications for the proposed project.

Thank you for the opportunity to review and comment on this draft EIS. We look forward to working with USCG staff and representatives of the Applicant to adequately address these concerns. We encourage open communication between our technical staffs to achieve this goal. If you wish to discuss EPA's comments, please contact me at 404/562-9611 or (mueller.heinz@epa.gov), or Ted Bisterfeld of my staff at 404/562-9621 or (bisterfeld.ted@epa.gov)

Sincerely,

Heinz J. Mueller

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Enclosures: Enclosure 1, Detailed Comments on BOET Draft EIS
Enclosure 2, EPA Rating System Description

Enclosure 1: Detailed Comments on Bienville Offshore Energy Terminal Draft EIS

Technology Alternatives

Section 2.2.4 LNG Vaporization Technology Alternatives

1. Page 2-58, third paragraph: The discussion should clarify that there are several variations on the design of ambient air vaporizers (AAV). AAV can directly transfer heat from air across surface exchangers using natural draft or forced draft designs, or heat can be transferred indirectly, i.e., using an intermediate fluid. (Soudek, M., 2006)

Section 2.2.4.2 LNG Vaporization Technologies Considered but Eliminated from Further Analysis

1. Pages 2-61 and 2-62, Table 2-8, "Comparison of Regasification Technology Alternatives": The table should provide footnotes for all the values for the AAV alternative. Specifically, the table should indicate if the values are based on a direct or indirect heat exchange design. Since the efficiency of an AAV is dependant on relative humidity, the table should provide a range for all the values for the AAV alternative based on the range of atmospheric conditions at the proposed site.

2. The AAV value for the "vaporizer footprint" referenced a 2006 presentation given by Milos Soudek of Mustang Engineering for its "LNG Smart" ambient air vaporization technology. However, the information for the AAV alternative (*i.e.,* the natural gas usage for regasification, the use of sodium hypochlorite for bio-fouling control, the use of external de-icers for frost, and the total cost) does not conform to the information in the referenced Mustang presentation. It should be noted that the Soudek presentation indicates that the water condensate formed with the LNG Smart technology would not require treatment prior to disposal, nor would frost or fog be a concern due to the use of forced air and an intermediate heat exchange medium.

3. Table 2-8 should reference calculations (which should be included elsewhere in the draft EIS) for determining the values for the cost of tugboats and service vessels for all the regasification alternatives. The table reports a value of "0" for the cost of service vessels needed for the proposed HiLoad alternative; however, this does not conform to the information of pages 2-8 and 2-9, which describes several components of the HiLoad that would require regular equipment maintenance by service crews being transported from the support platform and from shore. Additionally, text elsewhere says a support vessel is necessary for LNG carrier mooring operations and it is not clear whether its impacts are included in the table.

4. Footnotes for Table 2-8 indicate that some values were based on adjustments to values from the Compass Port final EIS for 1.4 Bcfd "for AAV." However, the AAV alternative regasification technology for Compass Port was not included in its final EIS.

5. The discussion on page 2-67 about environmental and technical issues does not differentiate between AAVs using direct heat exchange and AAVs using indirect heat exchange, such as the LNG Smart Vaporization technology mentioned on page 2-66 and in other sections of the document. Treatment of condensates prior to discharge, freezing of moisture on heat exchange surfaces and fog formation, are common with direct AAV units. According to the Soudek presentation, these issues are eliminated with the use of indirect AAV units using forced air. Also, the third paragraph should clarify the statement, "Potential increased impacts on marine life are associated with the use of glycol and selected intermediate fluids for primary vaporization (propane, refrigerant R-22, Enviro-Kool)." According to Mustang Engineering, propane would not be used as the intermediate loop warming agent; rather potassium formate would be used. Is the conclusion here that the increased marine impacts from AAV more substantial relative to those impacts that would occur from the use of the open-loop HiLoad technology?

Entrainment and Impingement Impacts of Proposed BOET Open-Loop Vaporizer

4.1.2.13 Zooplankton Operation Impacts Pages 4-92 thru 4-94

1. The HiLoad vaporization system proposed for BOET would employ an open-loop heat exchanger technology known as "shell and tube." While this technology can be utilized in a closed-loop configuration, the Applicant proposes it in an open-loop mode whereby operation would withdraw 127 million gallons per day of ambient Gulf water. Thermal discharge impacts need to be considered further due to entrainment into and exposure to low plume temperatures (see discussion and calculations below regarding "Ichthyoplankton").

2. Due to the large numbers of zooplankton that would potentially be entrained into the discharge plume the actual total zooplankton losses, when added, may be at least several times the losses described in this discussion of intake entrainment alone.

Because the ichthyoplankton is an important component of the zooplankton, both numerically and nutritionally, they should be added into calculations of zooplankton losses due to BOET operation. When correctly added into these estimates, adverse impacts of all zooplankton losses on the food web (page 4-94) may be several times the impacts described when only the invertebrate component zooplankton losses are considered.

EPA recommends that ichthyoplankton and other zooplankton losses not be presented as a proportion of the entire Gulf. As indicated by northeastern GOM circulation patterns (see comment 6. Zoogeography of Fisheries Resources and BOET Impacts to Ichthyoplankton and Fisheries. 3.0 Affected Environment, 3.1.2. Biological Resources. Below) it should be clear that eggs and larval produced by local spawning on the west Florida, Mississippi and Alabama shelf and adjacent waters are not distributed Gulf wide, but recruit back to the west FL - MS - AL shelf due to regional entrainment in cyclonic circulation patterns established in the Northern Gulf.

EPA believes that the dead biomass exiting the heat exchanger will not be of nutritional value to planktivores. The non-living organic matter discharged is considered a regulated waste stream (Total Suspended Solids) and a source of biological oxygen demand.

4.1.2.14 Ichthyoplankton Operation Impacts Pages 4-97– 4-105

3. Page 4-97, Last Paragraph. The draft EIS states that it is not possible to model quantities of ichthyoplankton potentially impacted by cold wastewater discharges due to lack of density data – then the discussion proceeds to do those calculations for the seawater intake on Page 4-98. The same egg and larvae density data used for intake entrainment is equally valid for discharge impact assessment. Also, the draft EIS has not fully accounted for the physical mechanism of discharge plume exposure. Accordingly, the quantity of ichthyoplankton potentially impaired can be estimated. See below:

BOET Discharge Entrainment

4. The discharge from the LNG facility as currently proposed by the applicant would result in the formation of a jet and plume that would induce mixing and the subsequent dilution of the wastewater. Turbulent jets and plumes are the mechanisms by which wastewater discharges entrain or incorporate large volumes of surrounding ambient seawater and mix with the discharge, thereby accomplishing initial dilution of the wastewater (Fischer et. al, 1979). With BOET, cold discharged wastewater would entrain warmer ambient water. The warmer ambient water (and any associated organisms) is rapidly exposed to the colder water and would then be cooled until equilibrium is reached. There can be several mechanisms of entrainment (i.e., aspirated, forced and turbulent) but the effect is the establishment of a flow field. Thus, the jet/plume induces a flow field in the surrounding ambient fluid. (EPA, 1993)

When adjacent plumes, such as in a case with a multiport diffuser, grow sufficiently, they begin to merge and entrain each other. Because the HiLoad module of the BOET facility has two discharges rather than a multiport diffuser, this occurs sufficiently downstream where the temperature differentials are small.

EPA has made the following calculations according to the EPA PLUMES discharge model that utilizes the projected area entrainment (PAE) hypothesis to estimate the dilution of the discharge jet/plume. It incorporates both aspirated and forced entrainment represented by the following equation (the entrainment equation):

$$\frac{dm}{dt} = \rho A_P \mu + \rho A_T v_t$$

where dm is the incremental amount of mass entrained in the time increment dt, A_p is the projected area, μ is the ambient current speed normal to the projected area, ρ is the local ambient density, A_T is the area of the plume element in contact with the ambient fluid and v_T is the Taylor aspiration speed (related to the average plume velocity) (EPA, 1993). This equation shows that the amount of ambient water entrained is a function of the ambient density and current speed, the velocity of the jet/plume, and the shape of the jet/plume.

Again, entrainment is the mechanism by which the discharge jet/plume is diluted by ambient water. The average dilution factor, S_a, is the ratio of the effluent volume plus the volume of ambient dilution water to the effluent volume as in the following equation (EPA, 1993):

$$S_a = \frac{1}{\frac{v_e}{(v_e + v_a)}} = \frac{(v_e + v_a)}{v_e}$$

where v_e is the volume of the effluent and v_a is the volume flux of the ambient dilution water (the entrained volume). Therefore, the amount of entrained ambient water (and associated organisms) can be calculated from the average dilution achieved using the equation above.

$$v_a = (S_a - 1)\,v_e$$

For the BOET discharge, the temperature of the plume is expected to climb to 20°C at 4.6 meters from the discharge outlet based on the applicant's modeling. The average dilution achieved at this point is 4.884. Using the equation above, the amount of entrained ambient water that is exposed to the 20°C or less plume is approximately:

$$v_a = (4.884 - 1) \cdot 127\,MGD = 493\,MGD$$

Using the draft EIS estimates on page 4-98, we calculate that 636 million fish eggs and 1.3 billion fish larvae entrained each year at the intake, and a discharge rate of 127 million gallons/day, one simply multiplies by a factor of 3.9 to get approximately 2.5 billion fish eggs and 5.1 billion fish larvae entrained into the 20°C or lower portion of the cold discharge plume each year. Plume entrainment would be in addition to those organisms entrained through the intakes. The total plume entrainment at a dilution needed to get plume temperatures to within 1°C of ambient seawater temperatures would be approximately 11 times the discharge rate.

This impact to marine resources resulting from BOET was not analyzed in the draft EIS. We do agree with the draft EIS statement, however, that insufficient cold exposure data exists to make precise determination of mortality that may occur due to exposures. However, some data do exist as summarized below:

5. Effects of Reduced Temperatures on Early Life Stages of Fishes and Invertebrates

All organisms have to possess strategies for dealing with both short- and long-term temperature change. Fishes and marine invertebrates, as with most cold-blooded organisms, lack biochemical or physiological defenses to prevent close tracking of body temperatures to ambient temperatures. Thermal regulation in response to long term temperature change (i.e., seasonal, climatic) is accomplished through changes in body function efficiencies during changing thermal regimes. Body systems adapt to colder or warmer temperatures. Short-term temperature changes, such as those which occur during normal diurnal fluctuations, require behavioral regulation because the ambient conditions change too rapidly. The behavioral adaptation to short term change is usually accomplished by physically relocating to new microenvironments to hold body temperature within a preferred range.

It is well established that the early life stages of fishes and aquatic invertebrates are more sensitive than later juvenile and adult stages to large and rapid fluctuations in temperature as well as other physical and chemical parameters. Early life stages of fishes and aquatic invertebrates face two problems in regard to thermal regulation. First, eggs, larvae and early juvenile stages either completely lack or have severely limited motile functional capacity. Movement of planktonic stages is limited to very short distances, prohibiting their ability to seek preferable microenvironments necessary for short-term temperature adaptation. Second, metabolic processes of early life stages are focused primarily on rapid growth and development necessary for survival. Fully functioning enzyme systems needed for long-term adaptation are not developed in early life stages compared to juvenile and adult stages, limiting the range of optimal temperatures for eggs and larvae.

An extensive body of literature exists regarding the effects of elevated temperatures on aquatic organisms from studies of electric power generation. Though less well researched, the effects of reduced temperature on survival and developmental processes in early life stages of both marine and freshwater fish and invertebrates is fairly well documented in the scientific literature, due largely to the more recent interest in rearing commercially valuable species for aquaculture. Much of what is available documents effects of prolonged exposures to temperatures near or slightly below optimal for that species and the life stage studied. A smaller body of research deals with the effects of exposure to rapid reduction of temperature. Effects can differ depending on the life stage.

Eggs

Studies have shown that exposure of fish and invertebrate eggs to reduced temperatures can affect egg development, incubation period and hatching success, and condition of emerging larvae. Work by Sasaki et al. (1988) showed that exposure of marine fish eggs to low temperature at early embryo resulted in differential growth of and physical damage to embryonic structures. A number of studies have shown that temperatures both above and below optimum had a significant effect on egg hatch rates and incubation time in fishes (Rana, 1990a; Polo et al., 1991; Wang and Eckmann, 1994; Hart and Purser, 1995; Yang and Chen, 2005). Other studies demonstrated significantly reduced hatch rates and increased incubation times only at temperatures below optimal (Van Der Wal, 1985; Watanabe et al., 1995; Morehead and Hart, 2003; Garcia-Lopez et al., 2004). Hamasaki (2003) showed significantly reduced hatching success in a crab species at temperatures lower than optimal while Zacharia and Kakati (2004) saw only slightly lower hatching success in a penaeid shrimp 4°C below optimal.

Larvae

Rana (1990b) and Morehead and Hart (2003) found that fish larvae from eggs exposed to low temperatures were smaller at hatch. A number of studies have demonstrated that reduced temperatures have an adverse effect of larval survival and growth in fishes and invertebrates (Johnson and Katavic, 1986; Rana, 1990; Wang and Eckmann, 1994; Hart el al., 1996; Martinez-Palacios et al., 2002; Green and Fisher, 2004; Garcia-Lopez et al., 2004; Liddy et al., 2004; Asha and Muthiah, 2005; Fielder et al., 2005). Low temperatures resulted in delayed development and deformities in larval rearing studies (Rana 1990; Polo et al., 1991; Watanabe et al., 1995; Baynes and Howell, 1996; Lein et al., 1997; Trotter et al., 2003; Aritaki and Seikai, 2004; Zacharia and Kakati, 2004; Villarreal and Hernandez-Llamas, 2005; Bryars and Havenhand, 2005). Studies of larval behavior have shown adverse effects of low temperatures on such attributes as swimming ability (Green and Fisher, 2004) and feeding behavior (Sogard and Olla, 1998).

In addition, exposure to sub-lethal temperature extremes may affect the organism's ability to adapt to changes in other environmental parameters such as salinity and pH. All of these may ultimately impact the organism's chances for survival beyond the larval stage. Studies have shown that cold exposures, though not immediately lethal, may result in death within several days if development is delayed. Individuals that are generally weakened or that behave erratically may be more susceptible to starvation and predation.

The effects of cold shock, specifically, the exposure to rapid reductions, though not as well studied, have been shown to reduce survival in tropical marine fish larvae (Lamadrid-Rose and Boehlert, 1988). Fielder et al., (2000) showed that cold shock affected the behavior and availability (as food) of zooplankton. Cold shock has also been demonstrated to be an effective method of inducing chromosomal changes in fish and invertebrate eggs to produce sterility, when organisms are exposed shortly after fertilization. (Yamamoto and Sugawara, 1988; Peruzzi and Chatain, 2000; Piferrer et al., 2000; Piferrer et al., 2003).

The relative scarcity of information regarding cold discharge impacts on fish and invertebrate early life stages cannot be taken to mean that high mortalities will not occur – only that we cannot say what percentage of the large numbers exposed will be killed. Note that a 10% mortality in the discharge with an entrainment factor of 11 effectively doubles the total ichthyoplankton loss and subsequent, compounded fisheries impact.

Page 4-98: The draft EIS states that due to the plume temperatures and small area affected impacts will be minor to moderate. Portions of the discharge plume will be at the minimum temperatures expected: 20°F (11°C) lower than ambient. It can be seen from the above discussion on the physical mechanism of mixing that impact does not depend on the "area affected" but by the entrainment rate into portions of the plume bearing lethal temperatures. Potential discharge impacts to ichthyoplankton will be long-term, minor to major, adverse, direct and indirect.

Fishery Impacts

Equivalent Yield estimates are defined as: *"the number of adult fish that would be removed from the populations that would otherwise have survived to a size necessary for* *recreational or commercial fishery catches*" (emphasis added). Many (not all) managed marine species have, by federal and state regulation, minimum size (length of individual) restrictions for harvest for both recreational and commercial fisheries. The size limits are based on the knowledge that smaller sexually mature adults will have several years to spawn prior to their entry into the harvest, in order to sustain harvested populations. Unlike the managed fishery harvest, the ORV intake structures and discharge plume take the adult equivalents out of the population before they have had the opportunity to grow to sexual maturity and spawn, thereby reducing the number of recruits available to enter adult populations. The effects on populations due to the loss of sexually mature adults are compounded over time, especially in locally impacted fish stocks as adults are continually removed by fishing pressure without replacement. The loss of potential spawning adults of sizes smaller than those entered into the fishery harvest needs to be thoroughly analyzed. This loss may, over time, have much greater ecological and economic impacts than what may be apparent when viewing it simply in terms of annual fishery loss.

Most of the attention regarding fishery impacts for BOET and similar projects has been given to estimated impacts of intake entrainment on the three or four "species of concern" that are used in the fisheries modeling due to availability of early life history data. Much comment has been made regarding the validity of fishery impact estimates presented (reasonable – overestimates – underestimates). Regardless of the reasonableness of estimates presented, focus on these few fish species has masked the scope and magnitude of the actual impacts due to intake entrainment. Equally important none of this sheds any light on the added impacts of entrainment into the discharge plume and resultant low temperature exposures.

Table 1 (Draft EIS, Appendix E1) shows fish larvae (represented by 1% or more of the total) found in SEAMAP data in the area of the proposed BOET site. The table shows that of the 15 taxa identified, all except one could be identified only to the genus or family level, groups containing a number of species. Altogether perhaps several dozen fish species may be adversely affected by BOET operations and many of these have either recreational or commercial fishery value. In fishery impact discussions in the draft EIS where it refers to "species of concern" the discussion is limited to the 3 or 4 species used in the modeling exercise. EPA recognizes that early life history information is incomplete and in many cases unavailable for most of the "species of concern" actually impacted by BOET operations. EPA recommends, however, that the EIS recognize that though reasonable mortality estimates can't be made for many species, they will all be similarly impacted. Because these estimates can't be made, they are left out of the actual total fishery impacts in the DEIS.

6. Zoogeography of Fisheries Resources and BOET Impacts to Ichthyoplankton and Fisheries. 3.0 Affected Environment, 3.1.2. Biological Resources

As indicated by GOM circulation patterns discussed in Section 3.1.1.1. and Figure 3.1.1.1 (page 3-3) of the draft EIS, it can be seen that the northern Gulf east of the Mississippi River is dominated by a major cyclonic circulation pattern. The draft EIS states that neither the Loop Current nor associated gyres significantly intrude on circulation patterns in the vicinity of the proposed terminal.

It is well known that eggs and larval produced by local spawning on the west Florida, Mississippi and Alabama shelf and adjacent waters are not distributed Gulf-wide, but recruit back to the west FL - MS - AL shelf due to regional entrainment in cyclonic circulation patterns established in the Northern Gulf. Fishery impacts due to BOET operations will mainly be expressed locally with effects mainly on the MS-AL shelf fish stocks. For this reason, EPA believes the draft EIS may not accurately represent the impacts because it presents BOET impacts in terms of total Gulf fish catches.

Commercial fishery landings (by weight) for the Gulf of Mexico, Alabama and Mississippi, for the two most recent years for which the National Marine Fisheries Service (NMFS) data are published are presented in the table below. Both total and state landing are variable over the two years. Due to fuel and other operating costs fishing vessels travel no further than necessary so we may assume that the majority of the fishing effort represented in these landings data occurred on or very near to the Alabama and Mississippi shelf and adjacent waters.

Commercial fishery landings in the Gulf of Mexico, MS and AL, 2002 and 2003[1].

	2002 Thousand Pounds	**2003** Thousand Pounds
Gulf of Mexico	**1,716,140**	**1,600,481**
Alabama	23,380	25,344
Mississippi	217,053	213,116
AL/MS Combined	240,433	238,460

[1] http://www.st.nmfs.gov/st1/fus/fus03/02_commercial2003.pdf

The percentages of AL and MS commercial landings (by weight) of total Gulf landings for 2002 and 2003 are presented in the table below. We can assume that the AL and MS proportions of the Gulf totals, as a function of numbers of individuals, is roughly the same as the proportion of the catch by weight.

Alabama and Mississippi commercial fishery landings as a percentage of Gulf totals.

	2002	**2003**
Alabama	1.4	1.6
Mississippi	12.6	13.3
AL and MS Combined	14.0	14.9

It can be seen that the commercial catch on the MS and AL coasts represents a highly variable, but small (< 15% combined) percentage of the total Gulf of Mexico catch.

The numbers of 1-year equivalent animals destroyed by BOET operation remains fixed so its relative importance to the AL-MS fishery is much greater than for the entire Gulf. If the AL and MS fishery is approximately 15% of the total Gulf of Mexico fishery, all fishery impacts of BOET discussed in the draft EIS must be increased by a factor of 6.5

to 7.0 to be more accurately represented.

Because it is likely that recruitment of juvenile fishes produced from other geographic areas of the Gulf (LA and TX) back to the MS-AL shelf is limited by local circulation patterns, MS-AL stocks will be highly dependant on local egg and larval production. EPA recommends that this be addressed in the final EIS in accordance with the available literature regarding egg/larval transport on the MS-AL shelf and recruitment of same to MS-AL fish stocks.

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Air Quality Data and Analyses

Section 2.2.4.2 - Liquefied Natural Gas (LNG) Vaporization Technologies Considered but Eliminated from Further Analysis

1. The basis and assumptions for the emissions estimates associated with the alternatives provided in Table 2-8 is not provided in Appendix F (Air Quality Information) and also could not be verified in the cited references. In the case of Ambient Air Vaporization (AAV), the cited reference, the *Compass Port FEIS*, appears to provide emissions estimates for, and discusses a different technology than, the technology presented in this evaluation. EPA requests that the calculations and assumptions used for the alternatives emissions estimates be verified and included in the final EIS appendix, as they were for the proposed alternative, or the referenced documents be accurately cited to allow for an independent evaluation. In addition, EPA recommends that the discussion of the AAV be verified and the values in Table 2-8 more accurately reflect the uncertainty associated with these estimates (such as reporting values in a range, providing an assessment of uncertainty, and reporting less significant figures).

Section 3.1.8 - Air Quality

2. Severe Weather Events GOM (Page 3-104) – Severe Gulf of Mexico (GOM) events are presented in the air quality section, Table 3.2.8-4, without discussion. EPA recommends that the final EIS include a discussion on how these severe weather events relate to air quality assessments and how they were factored into the design, location, operational plans, etc., for BOET

3. Ambient Background Air Quality (Page 3-109) – Table 3.1.8-5 provides the background monitored air quality concentrations considered representative of the project location. As presented in the table, some ozone, sulfur dioxide, and particulate matter ($PM_{2.5}$) measurements appear to exceed the National Ambient Air Quality Standards (NAAQS). Providing background measurements greater than the NAAQS, without further explanation, could lead readers to question why the area is considered to be in attainment for the NAAQS. EPA recommends that this important point be clarified in the final EIS.

Section 4. Environmental Consequences

4. Air Quality Impacts The draft EIS accurately includes $PM_{2.5}$ as a Prevention of Significant Deterioration (PSD) regulated pollutant. However, the emissions estimates given throughout the draft EIS do not include or present the quantification of $PM_{2.5}$. Given that this pollutant will be subject to New Source Review permitting requirements, EPA recommends that $PM_{2.5}$ emissions estimates be included or addressed along with the other estimates for regulated pollutants throughout the final EIS.

5. Applicable Regulatory Requirements, Section 4.2.8.1 This section makes reference to applicable CAA requirements pursuant to 40 CFR 55.15. See Footnote 26 on page 4-193. The federal OCS regulations at 40 CFR 55 are not applicable to deepwater ports, but instead apply to facilities identified and authorized under the Outer Continental Shelf Lands Act (OCSLA). EPA recommends that this reference be removed.

6. Modeled Emissions (Page 4-205) – The draft EIS states that hourly emission rates for each piece of equipment were developed to represent the operating conditions over the period of interest (i.e., periods associated with the NAAQS for each pollutant). The actual modeled emission rates were not provided nor included in Appendix F. EPA requests that the modeled emission rates be provided so their adequacy and appropriateness can be evaluated.

7. Modeling Procedures (Pages 4-206, 207) – A general discussion of the modeling procedures and modeling results are provided but the complete report is not included in the final EIS. To allow evaluation of the modeling performed, EPA recommends that the modeling report (i.e., Part 71 Operating Permit New Source Review Minor Source Permit Application; Appendix D) be provided as a final EIS appendix or its location in the project docket be specifically identified.

8. Marine Fuel Sulfur Content (Page 4-206) – The draft EIS indicates international marine fuel sulfur regulations allow burning of up to 4.6% sulfur fuel oil. The current worldwide carrier fleet average is 2.7% sulfur fuel. Only 0.05% (500 ppm) sulfur fuel oil was considered in the emission calculations provided in Appendix F and used in the impact modeling. Given that the use of higher sulfur content fuel by LNG carriers mooring at BOET could have a significant impact on air quality, EPA believes that those greater emissions should be quantified and the impacts modeled.

9. Modeled Receptors (Page 4-206) – Common modeling procedures, including those in the protocol approved by EPA, exclude only modeling receptors from the patrolled Safety Exclusion Area. The nearest modeled receptor in the draft EIS evaluation is indicated to be beyond the three exclusion zones at the edge of the "Area To Be Avoided" (ATBA). Figure 2-9 shows this larger ATBA to

extend beyond and between both the Safety Exclusion Area and the No Anchor Area. EPA requests that the final EIS explain the reason the ATBA was excluded from the air quality impact analysis.

10. Regional Haze (Pages 4-208, 209) – The modeled regional haze impacts are presented as percentages without explanation of the effect on regional haze. In addition, the "acceptable regional haze target values" (i.e., 5% and 10% change in extinction) are not explained nor discussed. The results presented in the draft EIS show modeled regional haze values exceeding these target values. EPA recommends that the modeled regional haze exceedances be discussed or evaluated in terms of acceptability.

    The maximum 24-hour emission rates are normally used in regional haze modeling and the maximum percent change is associated with these emissions. The use of the annual distribution of LNG carriers (LNGC) does not appear applicable to the 24-hour visibility assessments. Because regional haze impacts are provided separately for each type of LNGC (Tables 4.1.8-8 and -9), it appears that the statement that "maximum percent change was the result of the assumed annual distribution of LNGCs" should be deleted or further explained. EPA recommends verification that the emission rates used in the modeling are appropriate to provide maximum expected 24-hour impacts.

11. Regional Haze (Tables 4.1.8-8 and -9) – The modeling results provided for the1996 LNGC Slow-Speed Diesel Case appears to be misreported. If there are 8 days with 10% or more change in extinction, there can not be zero days with 5% or more change. EPA recommends that these values be verified for accuracy. In addition, EPA recommends the values in Tables 4.1.8-8 and -9 be reported as "Number of Days..." rather than "Average Number of Days..."

12. Deposition (Page 4-208) - Deposition impacts do not appear to be provided in the draft EIS. EPA requests that quantitative deposition impacts be provided for the proposed and alternative actions.

13. Comparision of Impacts of Alternatives (Section 4.1.8.5) – EPA recommends that the first section addressing the deepwater port (DWP) design alternatives include a description of the type of design being addressed.

The basis and assumptions for the emissions estimates associated with the alternatives provided in Tables 4.1.8-11, -12, and -13 are not included and cannot be verified or evaluated. Such information is necessary for an accurate comparison of the alternatives. The basis for these emissions estimates also are not provided in Appendix F and the cited reference does not appear to be publicly available. The reference given is to the *TORP March 2007 Alternative Concept Evaluation*. This reference does not appear in the draft EIS References, Section 7, and does not appear to be available in the USCG docket for this facility. EPA requests that the calculations or assumptions used for the alternatives emissions estimates be included in the final EIS appendix, as it was for the proposed alternative. The referenced documents should also be included in the docket to allow for an independent evaluation of these assumptions.

The closed-loop vaporization alternative discussion indicates that air quality impacts would be similar to the proposed action during construction and decommissioning. However, no further details to substantiate this conclusion are given. EPA requests that this conclusion be explained.

Section 6 – Cumulative Impacts

14. OCS Oil and Gas Activities and Onshore Liquefied Natural Gas (LNG) Terminal (Page 6-8), and Incremental Contribution (Section 6.2.8) – The draft EIS identifies 41 active platforms within 25 miles of the planned BOET, with the nearest platform 2.1 miles away. The operational emissions and expected impacts from these platforms are not provided as part of the cumulative impact assessment. Of concern, in terms of cumulative impacts to the project's near-field impact area and Breton PSD Class I area, are those OCS oil and gas extraction program sources and DWP sources located in proximity to the proposed action (e.g., the identified 41 active OCS platforms), rather than those more broadly located throughout the Western and Central GOM Planning Areas. EPA recommends that the expected impacts from these platforms be included in the cumulative impact analysis, rather than the provided incremental comparison to the broad-based GOM planning area activities that were extracted from the MMS programmatic EIS documents.

In addition, Section 6.1.1.2, Onshore Liquefied Natural Gas (LNG) terminals, refers to Sections 6.2.7 (Cumulative Impacts on Transportation) and 6.2.8 (Cumulative Impacts on Offshore Air Quality) for discussions of overlapping impacts from these facilities. However, these onshore LNG terminals are not included in the Section 6.2.7 discussions of activities in the ROI.

Proposed BOET Terminal and Pipeline Location

1. Section 3.1.2.9 Page 3- 30. The Pinnacle Trends, discussed in the document, is a 70 lease block area designated by MMS as an important habitat subject to MMS' Live Bottom Stipulation. Their topography, hard bottom and varied sediments make them valuable benthic habitat, and their influence extends to the wider regional ecosystem offshore Alabama (MMS, 2006). The draft EIS acknowledges inclusion of Main Pass Lease Block 258 within the Pinnacle Trends, and the closest large feature, Shark Reef, is 0.8 miles from a proposed BOET interconnect pipeline. EPA recommends further consideration of other sites for the terminal outside of the designated Pinnacle Trends.

2. Section 3.1.4.3 Page 3-60. Proposed pipeline interconnections necessary for a port location in MP 258 are as close as 150 feet to some pinnacles. Numerous high relief pinnacles are located along the Dauphin Island interconnection route, and avoiding these

topographic features for new pipelines in this area could be problematic. EPA recommends considering alternative port sites outside the 70-lease block Pinnacle Trends.

Reference Cited for Terminal and Pipeline Comments:

Minerals Management Service (MMS). 2006. Gulf of Mexico OCS Oil and Gas Lease Sales: 2007-2012. Central and Western Planning Areas. Draft Environmental Impact Statement. Volume I. OCS EIS/EA MMS 2006-062.

Other Technical Comments

1. Section 1.5, Page 1-12. The draft EIS identifies EPA's NPDES Permit applicable to OCS facilities. Please also indicate that pursuant to Section 403 of the Clean Water Act, EPA must make a determination regarding the extent of the degradation that the discharge will cause to the marine environment and that EPA cannot issue an NPDES permit if it determines that the discharge will cause unreasonable degradation.

2. Section 2.1.1.8, Page 2.20. BOET would have 6,100 gallons of diesel fuel and 750 gallons of aviation fuel maintained on the support platform. EPA recommends that the discussion of accidents and risk of spills be specific to these products, these quantities and the proposed safeguards.

3. Section 2.2.3.3, Page 2-56. The draft EIS identifies 41 active platforms within 25 miles of the planned BOET, and the nearest platform is 2.1 miles away. One criterion for locating a deep water port is avoidance of potential conflicts with OCS oil and gas extraction. A distance of 2.1 miles might present a concern as super tankers maneuver during mooring. Also, MP Block 258 appears from MMS maps to be unleased at this time, but it is unclear what limitations exist under MMS regulations in regard to the proximity to extraction activities. The draft EIS should clarify at what density and proximity deep water port activities could interfere with oil and gas activities, and address the MMS guidelines.

4. Section 2.2.4.1, Page 2-59 and 2-60. The vaporizing screening criteria in the alternatives analysis sets vaporizer capacity at 1.4 Bscfpd, as specified for the Applicant's proposed vaporization system. The only justification mentioned for setting this gas output criterion is to enable ease of comparison of alternatives. Other planned or proposed LNG re-gasification facilities identified in Table 2-11 around the Gulf Coast and terminals elsewhere have various capabilities. Consideration of other treatment volumes would broaden the potential alternative technologies available for BOET.

5. Section 2.2.7.3, Page 2-87. To better understand the impacts of the seawater intake flows, we recommend that, for the proposed seawater withdrawal quantity of 127 mgd, the draft EIS provide the size and dimension of the flow field. (This would be where the water flow vectors are directed towards the intake screen for a range of ambient seawater speeds and directions).

6. Section 3.1.2, Page 3-5. The draft EIS includes data that demonstrate the variability of water currents both in speed and direction. This is relevant to assessing the impacts of a water intake. EPA is not convinced that the measurements of current speed and direction at 1,606 feet deep at a sampling station 17 miles away with much deeper water are indicative of the bottom currents 465 feet deep at the proposed BOET site.

7. Section 3.1.1.3, Page 3-6 and Table 3.1.1.8-3, Page 3-105. The table presenting NOAA buoy data in the preliminary draft EIS indicated annual average sea temperatures at the two closest stations to the proposed BOET are 22°C and 24.5°C. Those data have been deleted from the table. EPA previously indicated a potential discrepancy in the data with the data in the text starting on page 3-6. EPA recommends that the data be checked and that complete annual data for the proposed BOET site be presented.

8. Section 3.2.4, Page 3-40. EPA recommends further clarification of the meaning of the term "Region of Influence" as used in the document to make it clear whether it is used to define a marine ecological zone just for ichthyoplankton or a broader assemblage of organisms.

9. Section 4.1.2.13 Page 4-94. In the assessment of impingement and entrainment impacts to the plankton, there is no detailed analysis of potential minimization of operational impacts via alternative placement of the seawater intake. EPA recommends that alternative depths and seasonal/temporal alterations for adjusting the seawater intakes be fully considered, if the BOET HiLoad is permitted.

10. Section 4.1.2.14, Page 4-96. The proposed port site lies in 425-foot deep water. The site is approximately 60 miles offshore of the Cape Breton NWR, which includes valuable shallow water marine nursery habitat for finfish. The draft EIS should address the likely important life history interrelationships between the planktonic community in the BOET site vicinity and their juvenile and adult life stages occupying nursery waters of the NWR.

11. Section 4.1.2.14 Page 4-96. We note the entrainment impact assessment in the draft EIS focuses heavily on ichthyoplankton, and it is further narrowed to a focus on four fish species. Because of the importance to the marine food web of invertebrate species both in planktonic communities, and later the adult stages in and on the sea bottom, marine invertebrates, especially polychaetes and mollusks have continuing ecological importance in addition to numerous fish species. Polychaete worms typically comprise over 50% of the benthic population, becoming a major prey of bottom fish. We recommend that the final EIS acknowledge this importance.

12. Section 4.2.2.19, Page 4-101. Throughout the document the approach to quantitative assessment of impacts to the marine environment is to compare the loss of organisms from the BOET operation to the overall marine resources within the Gulf. This approach discounts the potential loss and importance of the resources within the immediate scope of the project and we recommend that the use of this approach be reexamined in the draft EIS.

13. Section 4.2.7.2, Page 4.157. The project would include an Area to be Avoided (ATBA) that would total 2,117 acres. EPA recommends that the final EIS clearly explain what if any activities could occur (consulting the MMS) within that area.

14. Section 6.2.2.5, Page 6-18. EPA recommends that rather than analyzing a comparison of the cumulative impacts of seawater withdrawals for BOET with cargo ships operating within the entire Gulf, the final EIS focus solely on the cumulative impacts of BOET's seawater withdrawals within the Alabama/Mississippi area of the northern Gulf within a 62-mile distance from shorelines. Such an analysis would be more relevant to the cumulative impacts to marine resources of concern. In addition, EPA recommends including in this analysis the withdrawal needs of the service/support vessels necessary for BOET. MMS would be a good source for the OCS data.

15. Executive Summary, Page 22. EPA would not equate monitoring, as identified here, with mitigation. EPA suggests that the final EIS identify all mitigation that is proposed for the project and the party responsible for implementation.

16. Appendix A-3. Comments attributed to EPA regarding another proposed deepwater terminal (Compass Port) appear in this draft EIS. Please add a preface that these comments are from EPA's comment letter on the Compass Port final EIS and are a generic representation of what EPA would require for NPDES permitting of any open-loop LNG vaporization proposal.

Enclosure 2: EPA Rating System Description*

Environmental Impact of the Action

LO-Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impacts. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS sate, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1-Adequate
The EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alterative and those of the alternatives reasonably available to the project or action. No further analysis or data collecting is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information
The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

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* From EPA Manual 1640 Policy and Procedures for the Review of the Federal Actions Impacting the Environment